Total No. of Printed Pages: 02

SUBJECT CODE NO: - YY-2366
FACULTY OF SCIENCE AND TECHNOLOGY
B. Sc. F. Y. SEM II (CBCGS) (Pattern 2022)
Examination April / May - 2024
Physics Paper - V Electricity & Magnetism

[Time: 1:30 Hours] **[Max. Marks: 40]**

Please check whether you have got the right question paper.

N. B
i) All questions are compulsory.
ii) All questions carry equal marks.
iii) Draw neat diagrams and give labels wherever necessary.
iv) Figures to the right indicate full marks.

Q1 a) State and prove Stoke's theorem. **10**

OR

Explain in brief
a) Coulomb's law.
b) Calculate the electric field intensity due to the diple of the dipole moment $4.5 * 10^{-10}$ C/m at a distance 1 m from its center and on its axis. **10**

Q2 a) Explain dielectrics and polarization of dielectrics. **10**

OR

Explain in brief **10**
a) Principle and construction of Ballistic galvanometer.
b) A proton at a distance of 0.1 meters from a long straight wire carrying current 1 Ampere is moving parallel to the direction of current flow with a speed of 1.5×10^8 m/s. Calculate the force on the proton. (Given: charge on proton = $1.6 * 10^{-19}$ & $\frac{\mu o}{4\pi} = 10^{-7}$)

Q3 Write short note on (any two) **10**
a) Divergence and curl of vector A, If $vector\ A = x^3\ i + xy^2\ j + z\ K$
b) Gauss's law
c) Relation between D, E and P
d) Ampere's law

Q4 Multiple Choice Questions **10**

1. If the divergence of the velocity vector of a fluid is zero, then,
   (a) the velocity vector is solenoid vector (b) Fluid is incompressible
   (c) there is no net flow of fluid (d) All of the above

2. Flux of electric field E is the
   (a) Line integral of E (b) Surface integral of E
   (c) Volume integral of E (d) None of the above

3. Dimensions of electrical potential are the same as
   (a) Work done (b) work done per unit charge
   (c) Force per unit charge (d) Electric field per unit charge

4. Work done on a unit positive charge in bringing it from infinity to any point is _____ at that point
   (a) intensity (b) Electrical potential (c) Force (d) none of these

5. The unit of polarization P is the same as,
   (a) D (b) E (c) V (d) q

6. Electric potential due to an electric dipole is directly proportional to
   (a) r^{-3} (b) r^{-2} (c) r^{-1} (d) r^{3}

7. Magnetic induction due to a straight conductor carrying current at a distance d from the conductor is
   (a) Directly proportional to d^2 (b) Inversely proportional to d^2
   (c) Directly proportional to d (d) Inversely proportional to d

8. S.I. unit of magnetic induction B is
   (a) Newton/Ampere-meter (b) Wb /m2 (c) Tesla (d) All the three

9. State which one of the following is correct
   (a) Joule = Coulomb X Volt (b) Joule = Coulomb / Volt
   (c) Joule = Ampere X Volt (d) Joule = -Volt / Ampere

10. If q is the charge passing through the coil of the Ballistic Galvanometer & suspension wire is twisted through θ, then
    (a) $q \alpha \theta$ (b) $q \alpha \theta^2$ (c) $q \alpha 1/\theta$ (d) $q \alpha 1/\theta^2$